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PATENT & TRADEMARK OFFICE

Patent
Attorney's Docket No. 1034382-000004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	**MAIL STOP AF**
Tomi VEIKONHEIMO et al.	Group Art Unit: 3617
Application No.: 10/539,089	Examiner: Daniel V. Venne
Filed: June 15, 2005	Confirmation No.: 9066
For: ARRANGEMENT IN A PROPULSION SYSTEM	

DECLARATION UNDER 37 C.F.R. §1.132 OF TOMI VEIKONHEIMO

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1. I, Tomi Veikonheimo declare the following:

2. I, Tomi Veikonheimo, am a citizen of Finland, and have the following mailing address: tomi.veikonheimo@fi.abb.com.

3. I received a Bachelor of Science degree from the Technical School of Turku in 1993 for my studies in the field of Naval architecture.

4. From 11.3.1997 to 30.1.1997 I was employed by Kvaerner Masa-Yards, and worked in the field of hydrodynamics as a hydrodynamicist.

5. From 31.1.1997 to the present I have been employed by ABB in the capacity of hydrodynamicist, and have focused on the development of pod hydrodynamics.

6. I am an inventor of the above identified U.S. patent application. I am familiar with the subject matter of the above identified U.S. patent application, including the content of current claims 1, 11 and 12:

> *1. Arrangement in a counter rotating propulsion system comprising an aft propeller installed on a thruster rotatable about a vertical axis, and a forward propeller installed on a shaft or on a thruster, whereby the aft propeller and the forward propeller have opposite directions of rotation and the aft and*

forward propellers are arranged opposing each other, each of the propellers having a hub with a cap, the hub and cap associated with the forward and aft propellers are arranged opposing each other, wherein at least two equally distributed flow blades are arranged on the cap of the forward propeller and that the flow blades are radially projecting from the cap, the flow blades link up to each other and extend beyond an aft facing end of the cap.

11. Arrangement in a counter rotating propulsion system, comprising an aft propeller installed on a thruster rotatable about a vertical axis, and a forward propeller installed on a shaft or on a thruster, the aft propeller and the forward propeller have opposite directions of rotation and the aft and forward propellers are arranged opposing each other, wherein each of the propellers have a hub with a cap, whereby the hub and cap associated with the forward and aft propellers are arranged opposing each other, at least two equally distributed flow blades are arranged on the cap of the forward propeller and the flow blades are radially projecting from the cap, the flow blades link up to each other and extend beyond an aft facing end of the cap.

12. An arrangement comprising:

a thruster rotatable about a vertical axis comprising an aft propeller, a first hub and a first cap; and

a forward propeller, and a second hub and a second cap associated with the forward propeller, the second cap having a diameter, the second cap comprising a plurality of equally spaced flow blades projecting from the second cap in a radial direction with no inclination and without extending beyond the diameter of the second cap;

wherein the aft propeller and the forward propeller have opposite directions of rotation;

wherein the first cap and the second cap are arranged opposing each other and are spaced apart; thereby defining a separation zone; and

wherein the flow blades are constructed and arranged to eliminate cavitation in the separation zone when the aft propeller is not co-axial with the forward propeller, the flow blades link up to each other and extend beyond an aft facing end of the cap.

7. I have reviewed the Final Rejection having a mailing date of May 6, 2008 including the rejection of claims 1-14 under 35 U.S.C. §103 as being obvious over WO

01/54971 to Varis ("Varis") in view of NO 10907 to Parsons; as well as the rejection of claims 1-14 as being obvious over Varis in view of GB 9792 to Parsons (which is characterized in the Final Rejection as essentially the same as NO 10907, thus both NO 10907 and GB 9792 will be collectively referred to as "Parsons").

8. In support of the grounds for rejection, it is stated in the Final Rejection that it would have been obvious to one of ordinary skill in the art that: ". . . an extension of the vanes or blades beyond an aft facing end of the cap would enhance this beneficial result by allowing water to even more effectively close in and press on the cap to impart pressure and additional forward thrust to the shaft."

9. However, extension of the vanes of Parsons beyond the aft facing end of the cap would have at least one detrimental impact on the efficiency of the propulsion system. Namely, extending the vanes of Parsons would increase the surface area of the rotatable body interacting with the water surrounding it, and thus increase the surface friction therewith. This increase in surface friction with the surrounding water caused by the increased surface area of extended vanes would require an additional amount of torque to rotate the propeller, and thus require increased power to turn the propeller relative to a propeller having a cap with vanes having a smaller overall surface area. Therefore, the power required to propel the ship, e.g., in the forward direction, would be relatively greater for the proposed modification of Parsons in which the vanes would be extended beyond the aft facing end of the cap.

10. This principle is also illustrated in the enclosed graph attached hereto as Exhibit A, which compares the propulsion of efficiency of an end cap with no vanes to an end cap having vanes. The graph of Exhibit A plots various propulsion characteristics. Namely, $10K_Q$ (the tenfold value of the torque coefficient K_Q ,a variable without dimensions, defined in a known way based on torque, water density, propeller rate of rotation and propeller diameter), K_T (thrust coefficient, a variable without dimensions, defined in a known way

based on the thrust, water density, propeller rate of rotation and propeller diameter), η_o (the propeller efficiency), and J (the advanced coefficient, $J = V_a/n*D$, wherein V_a is the propeller advance speed, n is the propeller rate of rotation and D is the propeller diameter). As shown therein, the construction which has a higher overall surface area (cap with fins), and thus a relatively higher surface area with higher resulting surface friction with the surrounding water, exhibits a lower overall propulsion efficiency than a construction having a lower overall surface area (cap without fins), and thus lower overall surface friction with the surrounding water. Thus, the analysis and comparison summarized by the graph of Exhibit A demonstrates the same principle as that discussed above in connection with the proposed modification or extension of the vanes of Parsons; a cap structure having a relatively larger surface area, and resulting relatively larger surface friction with the water surrounding it, can have a negative impact on the efficiency of the associated propulsion system.

11. I further declare that all statements made herein of my own knowledge are true and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the application or any patent issuing thereon.

Date:1.12.2008 By:_____
Tomi Veikonheimo

EXHIBIT A

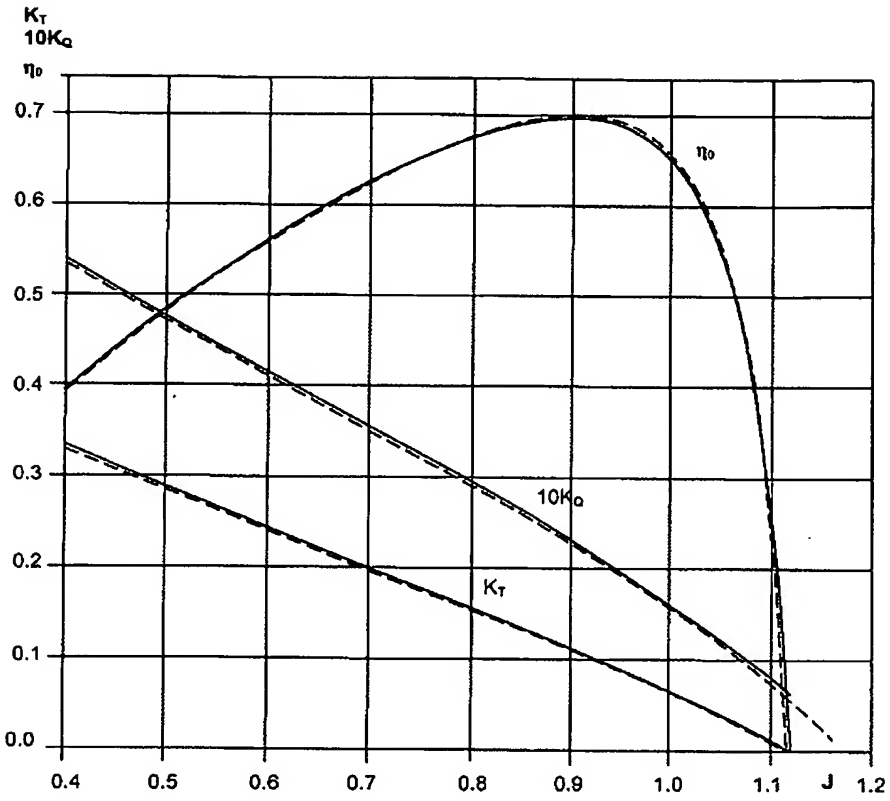

Fig. 2.9. Propeller model N8001 hydrodynamic charateristics

– – – – standard cap

——- cap with fins